

**REMARKS**

This communication is responsive to the Final Office Action of January 16, 2007 and to the Examiner's Interview of February 28<sup>th</sup> 2007. In the Final Office Action of January 16, 2007 the following objections were raised: [2-3] The abstract was objected to as not in narrative form and exceeding 150 words; [4] Claims 1-7, 9 and 17 were rejected under 35 U.S.C. 101 as directed to an algorithm and lacking of practical application; [5-6] were rejected under 35 U.S.C. 112 first paragraph as being a single means claim.

Applicant has amended Claims 1-7 and 17, added new Claims 18-19 and cancelled Claims 8-16.

**SUMMARY OF 28-FEB-2007 INTERVIEW**

The telephonic interview on February 28<sup>th</sup> 2007 included: Examiner Eva Zheng; Supervisory Examiner, Chieh Fan; inventor, Sam Heidari; and this correspondent, Charles Cary.

Sam Heidari spoke first and addressed the practical application of the invention, specifically an x-DSL transceiver with the ability to dynamically alter the range of frequencies spanned by a fixed number of modulated tones to conform to the spectral characteristics of a subscriber line, thereby improving the transceiver's communication capability without increasing the size of the Fourier Transform engine.

The parties then addressed Claim 1 in regard to both the outstanding rejections under 35 U.S.C. 101 and 112 first paragraph. Charles Cary indicated that Claim 1 was not in means plus function format and was directed to a functioning DSL transceiver with novel sub-components which vary tone spacing of a fixed number of tones to configure the transceiver based on the spectral characteristics of the subscriber line and as such had both practical application and patentable form.

The parties then discussed amendments to Claim 1 and specifically additional limitations related to the analog front end found in Claim 2. Both Supervisory Examiner Chieh Fan as

well as Examiner E. Zheng appeared receptive to this approach, and indicated that such an amendment would overcome both the rejections under 35 U.S.C. 101 and 112 first paragraph.

Supervisory Examiner Chieh Fan then addressed method Claim 17 in the context of the outstanding rejection under 35 U.S.C. 101. He indicated that the amendment of that claim to add what he termed a transmission act setting forth the effect of the expanded or contracted tone spacing in terms of the range of frequencies spanned by the fixed set of tones on the subscriber line should serve to overcome the outstanding rejection.

Finally, the parties discussed the proper context in which to present the above discussed amendments, and it was agreed that the Applicant would file a Request for Continued Examination and that the Examiners would consider same.

### **2-3 ABSTRACT OBJECTED TO**

The abstract was objected to as not in narrative form and exceeding 150 words.

The Applicant has amended the Abstract and requests that the objection be withdrawn.

### **4 CLAIMS 1-7,9 AND 17 REJECTED UNDER 35 U.S.C. 101**

Claims 1-7, 9 and 17 were rejected under 35 U.S.C. 101 as directed to an algorithm and lacking of practical application.

The Applicant has amended Independent Claim 1 to include an analog front end limitation operative with the digital signal processor to expand or contract the range of frequencies spanned by the fixed number of modulated tones on the subscriber line. The Applicant has chosen this approach rather than the more limiting language of Claim 2 since in both the Applicant's Claims and disclosure there remain alternate embodiments of the analog front end, specifically: a) a fixed analog-to-digital sample rate with variable interpolation or decimation, e.g. dependent Claims 2-3 or b) a variable analog-to-digital sample rate, e.g. dependent Claim 6. *"In an embodiment of the invention in which all analog*

*stages run at a common sample rate the decimation factor for a channel with expanded tone spacing will be less than that to which a channel with normal tone spacing will be subject. This allows all channels irrespective of tone spacing to be handled on analog stages with a common clock rate. In an alternate embodiment of the invention clock rates for the subsequent analog stage would vary depending on the tone spacing of the corresponding channel. “(Specification at page 13, lines 22-28)*

A similar limitation has been added to Independent Claim 17.

The resultant combinations of elements and acts in Amended Independent Claims 1 and 17 respectively comport with the requirements of 35 U.S.C. 101, specifically patentable subject matter as a new machine or process and utility in the form of an operative X-DSL transceiver for optimal spectrum management of communications over a subscriber lines of varying length and spectral characteristics.

For the reasons discussed immediately above, and further those addressed in the above referenced Examiner’s Interview which is incorporated herein by reference, the Applicant respectfully submits that the Independent Claims 1 and 17 as amended have been placed in a condition to overcome the rejection under 35 U.S.C. 101. Applicant requests that that rejection be withdrawn not only as to Independent Claims 1 and 17 but also as to all remaining Claims 2-7 and 18-19 dependent thereon, both by reason of their dependency from corresponding ones of Amended Independent Claims 1 and 17 as well as for other reasons of independent significance.

**5-6    CLAIMS 1-7 AND 9 REJECTED UNDER 35 U.S.C. 112 FIRST PARA.**

Claims 1-7 and 9 were rejected under 35 U.S.C. 112 first paragraph as being a single means claim.

Applicant respectfully submits that Claim 1 in either pre or post amendment form was not and is not in ‘means plus function’ form. Certainly, in the amended form in which it is currently presented, the Claim includes multiple elements, specifically the digital signal processor limitation, the Fourier transform module limitation and the analogue front end

limitation. In such Amended form, Independent Claim 1 has been amended to overcome the instant rejection for the reasons discussed above, and further those addressed in the above referenced Examiner's Interview which is incorporated herein by reference. Applicant requests that the rejection be withdrawn not only as to Independent Claim 1 but also as to all remaining Claims 2-7 dependent thereon, both by reason of their dependency from Amended Independent Claims 1 as well as for other reasons of independent significance.

### **NEW CLAIMS 18-19 ARE SUPPORTED**

The Applicant's new dependent Claims 18 and 19 are supported throughout the Application including: Figures 3A, 3B, 4A, 4B, 5, 6A-6D, and FIG. 7 and the associated Specification including the following: *"Where a specific channel loop qualifies for expanded tone spacing and concomitant higher data rates the IDFT implements these rates by periodically generating a tone set in an interval which is an integer fraction of that called for by the standard. Where the processing periodicity for successive coefficient sets is  $\frac{1}{2}$  the standard or 125 micro seconds the tone spacing expands to 8.625 kHz. (See FIG. 3B). This allows the same IDFT engine with the same sample size, the same number of tones, to provide up to twice the upstream bandwidth. Other channels which do not qualify for higher data rates have their coefficient sets transformed into tone sets at the 250 micro second interval called for by the standard. The DFT engine 204 and the IDFT engine 220 collectively form an IDFT/DFT engine which may be implemented in hardware, firmware or software."* (Applicant's Specification at Page 11, lines 17-27, emphasis added). *"In decision process 706 a determination is made for both the CO and subscriber modem units as to whether expanded tone spacing is supported. If expanded tone sets are supported control passes to process 708. In process 708 the spacing of the expanded tone set is established by setting the processing interval for each of the symbol/tone sets for that channel at an integer fraction or multiple of the standard processing interval of 250 microseconds. Control then passes to process 710 in which the training for the channel is effected. Then in process 712 the channel is characterized for each tone in the tone set. Next in decision process 714 a determination is made as to whether the subscriber loop which carries the channel qualifies for high data rates associated with an expanded tone spacing. If not control passes to process 720. If the channel's subscriber line loop qualifies as a short haul line/channel which supports the expanded tone spacing then control passes to process 730 in which state information is exchanged between the CO and subscriber modems."* (Applicant's Specification at page 18, lines 6-18, emphasis added) *"FIGS. 3 A-B are signal diagrams showing a common set of DMT tones with a standard tone spacing 300 of 4.3125 kHz (See FIG. 3A) and an expanded tone spacing of 8.625 kHz (See FIG. 3B). The variation in tone spacing is*

achieved by varying the processing periodicity for successive symbol/tone sets from the X-DSL standard of 250 microseconds per symbol per tone set to 125 microseconds per symbol per tone set for each channel. ”

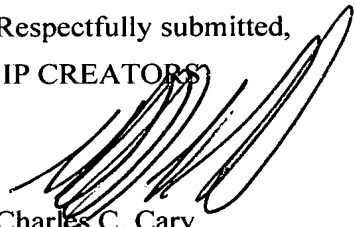
(Applicant's Specification at page 14, lines 3-8, emphasis added.)

## **CONCLUSION**

In view of the above remarks, and the amendments to the Claims, Applicant respectfully submits that all remaining Claims 1-7 and 17-19 have been placed in a condition for allowance, and requests that they be allowed. Early notice to this effect is solicited.

The Commissioner is authorized to charge any additional fees which may be required, including petition fees and extension of time fees, to Deposit Account No. 50-1338 (Docket No. VELCP010X1).

Respectfully submitted,  
IP CREATORS



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Date: July 9, 2007

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